1. A downhole apparatus for use in a well bore, said apparatus comprising:

a center mandrel; and

slip means disposed on said mandrel for grippingly engaging said well bore when in a set position, said slip means being at least partially made of a non-metallic material.

2. The apparatus of claim 1 characterized as a packing apparatus and further comprising packing means disposed on said mandrel for sealingly engaging said well bore when in a set position.

3. The apparatus of claim 2 wherein said slip means is an upper slip means disposed above said packing means and further comprising a lower slip means disposed below said packing means, said lower slip means being at least partially made of a non-metallic material.

4. The apparatus of claim 1 wherein said slip means comprises a slip support made of a non-metallic material.

5. The apparatus of claim 1 wherein said slip means comprises a slip wedge made of non-metallic material.

6. The apparatus of claim 1 wherein said slip means comprises:

a plurality of non-metallic slips disposed in an initial position around said mandrel; and

retaining means for holding said slips in said initial position.

7. The apparatus of claim 6 wherein said retaining means is characterized by a retaining band extending at least partially around said slips.

8. The apparatus of claim 6 wherein said retaining means comprises a non-metallic ring portion integrally formed with said slips and being fracturable during a setting operation, whereby said slips are separated.

9. The apparatus of claim 8 wherein said slips define a plurality of gaps therebetween adjacent to an end of said slips.

10. The apparatus of claim 6 further comprising a plurality of hardened inserts molded into said slips.

11. The apparatus of claim 10 wherein said inserts are steel.

12. The apparatus of claim 10 wherein said inserts are made of a non-metallic material.

13. The apparatus of claim 12 wherein said inserts are made of a ceramic material.

14. The apparatus of claim 1 wherein said non-metallic material is an engineering grade plastic.

15. The apparatus of claim 14 wherein said plastic is nylon.

16. The apparatus of claim 14 wherein said plastic is a phenolic material.

17. The apparatus of claim 16 wherein said phenolic material is one of Fiberite FM4056J, Fiberite FM4005 and Resinoid 1360.

18. The apparatus of claim 14 wherein said plastic is an epoxy resin.

19. A downhole apparatus for use in a well bore, said apparatus comprising:

a center mandrel;

a slip wedge disposed around said mandrel;

a plurality of separate non-metallic slips disposed around said mandrel adjacent to said wedge; and

retaining means for retaining said slips in an initial position out of engagement with the well bore.

20. The apparatus of claim 19 wherein said wedge is made of a non-metallic material.

21. The apparatus of claim 19 wherein said slips are made of engineering grade plastic.

22. The apparatus of claim 21 wherein said plastic is nylon.

23. The apparatus of claim 21 wherein said plastic is a phenolic material.

24. The apparatus of claim 21 wherein said phenolic material is Fiberite FM4056J.

25. The apparatus of claim 21 wherein said plastic is an epoxy resin.

26. The apparatus of claim 19 further comprising a plurality of inserts molded into said slips for grippingly engaging the well bore when in a set position.

27. The apparatus of claim 26 wherein said inserts are hardened steel.

28. The apparatus of claim 26 wherein said inserts are made of a non-metallic material.

29. The apparatus of claim 28 wherein said inserts are made of a ceramic material.

30. A downhole apparatus for use in a well bore, said apparatus comprising:

a center mandrel;

a slip wedge disposed around said mandrel;

a plurality of non-metallic slips disposed around said mandrel adjacent to said wedge; and

a non-metallic ring integrally formed at an end of each of said slips and adapted for holding said slips in an initial position out of engagement with the well bore.

31. The apparatus of claim 30 wherein said wedge is made of a non-metallic material.

32. The apparatus of claim 31 wherein said slips define a plurality of longitudinally extending gaps therebetween adjacent to an opposite end of said slips from said ring.

33. The apparatus of claim 30 wherein said ring is made of a fracturable engineering grade plastic.

34. The apparatus of claim 33 wherein said plastic is nylon.

35. The apparatus of claim 33 wherein said plastic is a phenolic material.

36. The apparatus of claim 33 wherein said phenolic material is Fiberite FM4056J.

37. The apparatus of claim 33 wherein said plastic is an epoxy resin.

38. The apparatus of claim 30 further comprising a plurality of inserts molded into said slips for grippingly engaging the well bore when in a set position.

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39. The apparatus of claim 38 wherein said inserts are hardened steel.

40. The apparatus of claim 38 wherein said inserts are made of a non-metallic material.

41. The apparatus of claim 38 wherein said inserts are made of a ceramic material.

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